

FIG. 18

Subject Classification

| Class | Instances | Weight Category | State |
|-------|---|-----------------|---------|
| ES | Empty Seat | < 10 lb | Empty |
| FFA | Normally Seated Adult | > 105 lb | Enable |
| FFC | Normally Seated Child | <10,105> lb | Enable |
| FFC | Normally Positioned Forward Facing Child Seat | <10,45> lb | Enable |
| OOP | Out-of-position Adult | > 105 lb | Disable |
| OOP | Out-of-position Child | < 105 lb | Disable |
| OOP | Out-of-position Forward Facing Child Seat | <10,45> lb | Disable |
| RFS | Rearward Facing Child Seat | <10,45> lb | Disable |
| RFS | Rearward Facing Infant Seat | <10,45> lb | Disable |

FIG. 19

Categorization of Human Subjects

| | Weight Range | | Height Range | |
|-------|----------------------|---------------------------|----------------------------|---------------------------|
| | kg (lb) | | m (in) | |
| Child | <11,25> (<24,55>) | <0.95,1.15> (<3'1",3'9">) | <1.10,1.30> (<3'7",4'3">) | <1.25,1.45> (<4'1",4'9">) |
| | <22,36> (<48,79>) | C11 | C12 | C13 |
| | <33,47> (<73,103>) | C21 | C22 | C23 |
| Adult | | C31 | C32 | C33 |
| | | <1.45,1.65> (<4'9",5'5">) | <1.60,1.80> (<5'3",5'11">) | <1.75,1.95> (<5'9",6'5">) |
| | <45,70> (<99,154>) | A11 | A12 | A13 |
| | <65,90> (<143,198>) | A21 | A22 | A23 |
| | <85,110> (<187,242>) | A31 | A32 | A33 |

All Human Subjects are to wear light clothes (typically slacks and T-shirt) on entry. Other types of clothing to be provided by ATI

Child Surrogates

| | | | | | | |
|------|-----------------------------|--|-------------------------------|--|------------------------------|--|
| Doll | Baby = 0.50 m (approx. 20") | | Infant = 0.75 m (approx. 30") | | Child = 1.20 m (approx. 48") | |
| | | | | | | |

FIG. 20

Rearward Facing Infant Seats

| Designation | Child Seat | Attributes |
|-------------|-----------------------|------------|
| Training | Arriva | base, hood |
| Independent | Assura 565 | hood |
| Training | Baby-Safe | - |
| Training | Century 590 | base, hood |
| Training | Evenflo Discovery | base, Tbar |
| Training | Evenflo Joyride (new) | hood |
| Independent | Evenflo Joyride (old) | - |
| Training | Gerry Guard | base |
| Validation | Kolcraft Travelabout | base, Tbar |
| Training | Rock-n-Ride | - |
| Training | TLC | - |

FIG. 21

Rearward Facing Child Seat

| Designation | Child Seat | Attributes |
|-------------|-------------------------|------------|
| Training | Century 1000 | - |
| Validation | Century 2000 STE | - |
| Training | Century Ovation | - |
| Training | Century Smartmove 5T | table |
| Training | Champion | table |
| Training | Fisher Price Child Seat | table |
| Training | Touriva | - |
| Training | Ultara | table |
| Training | Vario Exclusive | table |

FIG. 22

Forward Facing Child and Booster Seats

| Designation | Child Seat | Attributes |
|-------------|-------------------------|------------|
| Training | Century 1000 | - |
| Validation | Century 2000 STE | - |
| Training | Century Ovation | - |
| Validation | Century Smartmove 5T | table |
| Training | Champion | table |
| Validation | Fisher Price Booster | - |
| Training | Fisher Price Child Seat | table |
| Training | Gerry Booster | table |
| Training | Touriva | - |
| Training | Ultara | table |
| Training | Vario Exclusiv | table |

FIG. 23

Vehicle Configuration Series

| Configuration | Seat Track (+/- 0.5") | | | | | | | | | | Seatback Recline (+/- 2°) | | | | | | | | | | Windows | | | | | | | | | | Visor | | | | | | | | | | Convertible Top | | | | | | | | | |
|---------------|-----------------------|---|---|---|---|---|---|---|---|----|---------------------------|----|----|----|----|----|----|----|----|----|---------|----|----|----|----|----|----|----|----|----|-------|----|----|----|----|----|----|----|----|----|-----------------|----|----|----|----|----|----|----|--|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | | | | | | | |
| A | 0 | 0 | 2 | 2 | 4 | 4 | 6 | 6 | 0 | 18 | 4 | 12 | 20 | 2 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | | | | | |
| B | 1 | 1 | 3 | 3 | 5 | 5 | 7 | 7 | 2 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | | | | | |
| C | 0 | 0 | 2 | 2 | 4 | 4 | 6 | 6 | 5 | 15 | 4 | 16 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | | | | | |
| D | 1 | 1 | 3 | 3 | 5 | 5 | 7 | 7 | 4 | 16 | 5 | 15 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | | |
| E | 0 | 0 | 2 | 2 | 4 | 4 | 6 | 6 | 0 | 18 | 4 | 12 | 20 | 2 | 20 | 0 | 18 | 4 | 12 | 20 | 2 | 20 | 0 | 18 | 4 | 12 | 20 | 2 | 20 | 0 | 18 | 4 | 12 | 20 | 2 | 20 | 0 | 18 | 4 | 12 | 20 | 2 | 20 | 0 | 18 | 4 | 12 | 20 | | |
| F | 1 | 1 | 3 | 3 | 5 | 5 | 7 | 7 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | 0 | 18 | 4 | 12 | 20 | | | | |
| G | 0 | 0 | 2 | 2 | 4 | 4 | 6 | 6 | 4 | 16 | 2 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | | |
| H | 1 | 1 | 3 | 3 | 5 | 5 | 7 | 7 | 2 | 20 | 4 | 16 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | 2 | 10 | 18 | 0 | 15 | 20 | | | | | |

Sequence for Child Seat Training Data Collection:

Start object in center of the seat. Trainer has both hands on the steering wheel;

With a smooth motion, push the object fully outboard, then pull it fully inboard, then push it to center position, then put hands back on the steering wheel;

With a smooth motion, rotate the object 45 degrees outboard, the rotate 45 degrees inboard, then rotate back to center, then put hands back on the wheel.

Sequence for Out-of-Position Forward Facing Child Seat Training Data Collection

Start with object in the center line, leaning onto the Instrument Panel;

With a smooth motion, push the object fully outboard, then pull it fully inboard, then push it to the center;

Repeat this sequence with a 150 mm (6") gap between the object and the Instrument Panel; Apply small (+/- 10°) rotations.

Repeat this sequence with a 300 mm (12") gap between the object and the Instrument Panel; Apply small (+/- 10°) rotations.

Sequence for Human Subject Training Data Collection:

Lean forward and outboard such that head and/or shoulders touch the Fire line;

Gently traverse inboard while carefully following the Fire line until the center of the vehicle is reached;

Lean halfway back towards the seatback and traverse outboard up against the side window. Rotate torso while doing so;

Lean back into the seat and traverse inboard towards the center. Rotate torso while doing so;

Sit back in the seat; "operate" radio controls, glove box, window, or seat controls; assume a brace posture;

Do not cross the Fire line with head and/or shoulders at any time.

Sequence for Out-of-Position Human Subject Training Data Collection:

Lean forward and outboard such that head and/or shoulders touch the Instrument Panel;

Gently traverse inboard towards the center console;

Move back 150 mm (6") and gently traverse back to the most outboard position;

Move back 300 mm (12") and gently traverse back to the center console;

"Operate" radio controls and glovebox while head and/or shoulders remain in front of the Fire line.

FIG. 24A

Network Training Set Collection Matrix (Vehicle E)
Rev 1.1

| # | Class | Subject/Object | Attributes | Actions | Config. | Belt | Conditions |
|----|-------|----------------|---------------------------|--------------------------------|---------|------|------------|
| 1 | ES | None | None | Motions of track and recline | (A) | N.A. | Ambient |
| 2 | FFA | A22 | Medium Clothes, Magazine | Motions in safe seating area | B | Yes | Ambient |
| 3 | OOP | A22 | Medium Clothes | Motions in NFZ | C | No | Ambient |
| 4 | FFC | Century 1000 | Infant Doll | Motions in safe seating area | D | No | Ambient |
| 5 | RFS | Century 1000 | Baby Doll | Motions in entire seating area | E | No | Ambient |
| 6 | ES | None | Beaded Cover | Motions of track and recline | (F) | N.A. | Ambient |
| 7 | FFA | A11 | Medium Clothes | Motions in safe seating area | G | Yes | Ambient |
| 8 | OOP | Touriva | Infant Doll, Blanket | Motions in NFZ | H | No | Ambient |
| 9 | FFC | Touriva | Infant Doll, Blanket | Motions in safe seating area | A | No | Ambient |
| 10 | RFS | Century 590 | Baby Doll, Hood | Motions in entire seating area | B | No | Ambient |
| 11 | ES | None | Fabric Cover | Motions of track and recline | (C) | N.A. | Ambient |
| 12 | FFA | A33 | Medium Clothes, Newspaper | Motions in safe seating area | D | No | Ambient |
| 13 | OOP | A33 | Medium Clothes | Motions in NFZ | E | Yes | Ambient |
| 14 | FFC | C22 | Medium Clothes | Motions in safe seating area | F | No | Ambient |
| 15 | RFS | Touriva | Baby Doll, Blanket | Motions in entire seating area | G | No | Ambient |
| 16 | ES | None | Blanket | Motions of track and recline | (H) | N.A. | Ambient |
| 17 | FFA | A21 | Heavy Clothes | Motions in safe seating area | A | No | Ambient |
| 18 | OOP | C11 | Heavy Clothes | Motions in NFZ (standing) | B | No | Ambient |
| 19 | FFC | C11 | Heavy Clothes | Motions in safe seating area | C | No | Ambient |
| 20 | RFS | TLC | Baby Doll | Motions in entire seating area | D | No | Ambient |
| 21 | ES | None | None | Motions of track and recline | (E) | N.A. | Solar Heat |
| 22 | FFA | A12 | Light Clothes, Magazine | Motions in safe seating area | F | Yes | Solar Heat |
| 23 | OOP | A12 | Light Clothes | Motions in NFZ | G | No | Solar Heat |
| 24 | FFC | Champion | Infant Doll | Motions in safe seating area | H | No | Solar Heat |
| 25 | RFS | Champion | Baby Doll | Motions in entire seating area | A | No | Solar Heat |

FIG. 24B

| | | | | | | | |
|----|-----|-----------------|--------------------------|--------------------------------|-----|------|------------|
| 26 | ES | None | Beaded Cover | Motions of track and recline | (B) | N.A. | Solar Heat |
| 27 | FFA | A23 | Light Clothes | Motions in safe seating area | C | Yes | Solar Heat |
| 28 | OOP | Vario Exclusive | Child Doll | Motions in NFZ | D | No | Solar Heat |
| 29 | FFC | Vario Exclusive | Child Doll, Blanket | Motions in safe seating area | E | No | Solar Heat |
| 30 | RFS | Joyride (new) | Baby Doll | Motions in entire seating area | F | No | Solar Heat |
| 31 | ES | None | Fabric Cover | Motions of track and recline | (G) | N.A. | Solar Heat |
| 32 | FFA | A32 | Light Clothes, Newspaper | Motions in safe seating area | H | No | Solar Heat |
| 33 | OOP | A32 | Light Clothes | Motions in NFZ | A | Yes | Solar Heat |
| 34 | FFC | C33 | Light Clothes | Motions in safe seating area | B | No | Solar Heat |
| 35 | RFS | Ultara | Baby Doll, Blanket | Motions in entire seating area | C | No | Solar Heat |
| 36 | ES | None | Blanket | Motions of track and recline | (D) | N.A. | Solar Heat |
| 37 | FFA | A22 | Medium Clothes | Motions in safe seating area | E | No | Solar Heat |
| 38 | OOP | C21 | Medium Clothes | Motions in NFZ | F | No | Solar Heat |
| 39 | FFC | C21 | Medium Clothes | Motions in safe seating area | G | No | Solar Heat |
| 40 | RFS | Arriva | Baby Doll, Hood | Motions in entire seating area | H | No | Solar Heat |
| 41 | ES | None | Handbag | Motions of track and recline | (H) | N.A. | Ambient |
| 42 | FFA | A11 | Heavy Clothes, Magazine | Motions in safe seating area | G | Yes | Ambient |
| 43 | OOP | A11 | Heavy Clothes | Motions in NFZ | F | No | Ambient |
| 44 | FFC | Gerry Booster | Infant Doll | Motions in safe seating area | E | No | Ambient |
| 45 | RFS | Fisher Price CS | Baby Doll | Motions in entire seating area | D | No | Ambient |
| 46 | ES | None | Beaded Cover, Handbag | Motions of track and recline | (C) | N.A. | Ambient |
| 47 | FFA | A33 | Heavy Clothes | Motions in safe seating area | B | Yes | Ambient |
| 48 | OOP | Ultara | Infant Doll, Blanket | Motions in NFZ | A | No | Ambient |
| 49 | FFC | Ultara | Infant Doll, Blanket | Motions in safe seating area | H | No | Ambient |
| 50 | RFS | Baby Safe | Baby Doll, Handle up | Motions in entire seating area | G | No | Ambient |
| 51 | ES | None | Fabric Cover, Handbag | Motions of track and recline | (F) | N.A. | Ambient |
| 52 | FFA | A21 | Heavy Clothes, Newspaper | Motions in safe seating area | E | No | Ambient |
| 53 | OOP | A21 | Heavy Clothes | Motions in NFZ | D | Yes | Ambient |

FIG. 24C

| | | | | | | | |
|----|-----|-----------------|--------------------------|--------------------------------|-----|------|-----------------|
| 54 | FFC | C12 | Heavy Clothes | Motions in safe seating area | C | No | Ambient |
| 55 | RFS | Vario Exclusive | Baby Doll, Blanket | Motions in entire seating area | B | No | Ambient |
| 56 | ES | None | Blanket, Handbag | Motions of track and recline | (A) | N.A. | Ambient |
| 57 | FFA | A12 | Rain Clothes | Motions in safe seating area | H | No | Ambient |
| 58 | OOP | C23 | Rain Clothes | Motions in NFZ | G | No | Ambient |
| 59 | FFC | C23 | Rain Clothes | Motions in safe seating area | F | No | Ambient |
| 60 | RFS | Rock'n'Ride | Baby Doll | Motions in entire seating area | E | No | Ambient |
| 61 | ES | None | None | Motions of track and recline | (D) | N.A. | Air Conditioner |
| 62 | FFA | A23 | Light Clothes, Magazine | Motions in safe seating area | C | Yes | Air Conditioner |
| 63 | OOP | A23 | Light Clothes | Motions in NFZ | B | No | Air Conditioner |
| 64 | FFC | Century Ovation | Infant Doll | Motions in safe seating area | A | No | Air Conditioner |
| 65 | RFS | Century Ovation | Baby Doll | Motions in entire seating area | H | No | Air Conditioner |
| 66 | ES | None | Beaded Cover | Motions of track and recline | (G) | N.A. | Air Conditioner |
| 67 | FFA | A32 | Light Clothes | Motions in safe seating area | F | Yes | Air Conditioner |
| 68 | OOP | Fisher Price CS | Child Doll | Motions in NFZ | E | No | Air Conditioner |
| 69 | FFC | Fisher Price CS | Child Doll, Blanket | Motions in safe seating area | D | No | Air Conditioner |
| 70 | RFS | Gerry Guard | Baby Doll | Motions in entire seating area | C | No | Air Conditioner |
| 71 | ES | None | Fabric Cover | Motions of track and recline | (B) | N.A. | Air Conditioner |
| 72 | FFA | A22 | Light Clothes, Newspaper | Motions in safe seating area | A | No | Air Conditioner |
| 73 | OOP | A22 | Light Clothes | Motions in NFZ | H | Yes | Air Conditioner |
| 74 | FFC | C32 | Light Clothes | Motions in safe seating area | G | No | Air Conditioner |
| 75 | RFS | Smartmove 5T | Baby Doll, Blanket | Motions in entire seating area | F | No | Air Conditioner |
| 76 | ES | None | Blanket | Motions of track and recline | (E) | N.A. | Air Conditioner |
| 77 | FFA | A11 | Medium Clothes | Motions in safe seating area | D | No | Air Conditioner |
| 78 | OOP | C22 | Medium Clothes | Motions in NFZ | C | No | Air Conditioner |
| 79 | FFC | C22 | Medium Clothes | Motions in safe seating area | B | No | Air Conditioner |
| 80 | RFS | Discovery | Baby Doll, Handle up | Motions in entire seating area | A | No | Air Conditioner |
| 81 | ES | None | Pizza Box | Motions of track and recline | (B) | N.A. | Ambient |

FIG. 24D

| | | | | | | | |
|-----|-----|-----------------|-------------------------|--------------------------------|-----|------|----------|
| 82 | FFA | A33 | Rain Clothes, Magazine | Motions in safe seating area | A | Yes | Ambient |
| 83 | OOP | A33 | Rain Clothes | Motions in NFZ | D | Yes | Ambient |
| 84 | FFC | Champion | Infant Doll | Motions in safe seating area | C | No | Ambient |
| 85 | RFS | Champion | Baby Doll | Motions in entire seating area | F | No | Ambient |
| 86 | ES | None | Beaded Cover, Pizza Box | Motions of track and recline | (E) | N.A. | Ambient |
| 87 | FFA | A21 | Rain Clothes | Motions in safe seating area | H | Yes | Ambient |
| 88 | OOP | Vario Exclusive | Child Doll, Blanket | Motions in NFZ | G | No | Ambient |
| 89 | FFC | Vario Exclusive | Child Doll, Blanket | Motions in safe seating area | B | No | Ambient |
| 90 | RFS | Joyride (new) | Baby Doll, Hood | Motions in entire seating area | A | No | Ambient |
| 91 | ES | None | Fabric Cover, Pizza Box | Motions of track and recline | (D) | N.A. | Ambient |
| 92 | FFA | A12 | Rain Clothes, Newspaper | Motions in safe seating area | C | No | Ambient |
| 93 | OOP | A12 | Rain Clothes | Motions in NFZ | F | No | Ambient |
| 94 | FFC | C23 | Rain Clothes | Motions in safe seating area | E | No | Ambient |
| 95 | RFS | Ultara | Baby Doll, Blanket | Motions in entire seating area | H | No | Ambient |
| 96 | ES | None | Blanket, Pizza Box | Motions of track and recline | (G) | N.A. | Ambient |
| 97 | FFA | A23 | Light Clothes | Motions in safe seating area | B | No | Ambient |
| 98 | OOP | C32 | Light Clothes | Motions in NFZ | A | No | Ambient |
| 99 | FFC | C32 | Light Clothes | Motions in safe seating area | D | No | Ambient |
| 100 | RFS | Arriva | Baby Doll, Hood | Motions in entire seating area | C | No | Ambient |
| 101 | ES | None | None | Motions of track and recline | (F) | N.A. | Car Heat |
| 102 | FFA | A32 | Light Clothes, Magazine | Motions in safe seating area | E | Yes | Car Heat |
| 103 | OOP | A32 | Light Clothes | Motions in NFZ | H | Yes | Car Heat |
| 104 | FFC | Century 1000 | Infant Doll | Motions in safe seating area | G | No | Car Heat |
| 105 | RFS | Century 1000 | Baby Doll | Motions in entire seating area | B | No | Car Heat |
| 106 | ES | None | Beaded Cover | Motions of track and recline | (A) | N.A. | Car Heat |
| 107 | FFA | A22 | Rain Clothes | Motions in safe seating area | D | Yes | Car Heat |
| 108 | OOP | Vario Exclusive | Infant Doll | Motions in NFZ | C | No | Car Heat |
| 109 | FFC | Touriva | Infant Doll, Blanket | Motions in safe seating area | F | No | Car Heat |

FIG. 24E

| | | | | | | | |
|-----|-----|-----------------|----------------------------|--------------------------------|-----|------|----------|
| 110 | RFS | Century 590 | Baby Doll | Motions in entire seating area | E | No | Car Heat |
| 111 | ES | None | Fabric Cover | Motions of track and recline | (H) | N.A. | Car Heat |
| 112 | FFA | A11 | Light Clothes, Newspaper | Motions in safe seating area | G | No | Car Heat |
| 113 | OOP | A11 | Light Clothes | Motions in NFZ | B | No | Car Heat |
| 114 | FFC | C32 | Light Clothes | Motions in safe seating area | A | No | Car Heat |
| 115 | RFS | Touriva | Baby Doll, Blanket | Motions in entire seating area | D | No | Car Heat |
| 116 | ES | None | Blanket | Motions of track and recline | (C) | N.A. | Car Heat |
| 117 | FFA | A33 | Heavy Clothes | Motions in safe seating area | F | No | Car Heat |
| 118 | OOP | C22 | Heavy Clothes | Motions in NFZ | E | No | Car Heat |
| 119 | FFC | C22 | Heavy Clothes | Motions in safe seating area | H | No | Car Heat |
| 120 | RFS | TLC | Baby Doll | Motions in entire seating area | G | No | Car Heat |
| 121 | ES | None | Attaché Case (flat) | Motions of track and recline | (G) | N.A. | Ambient |
| 122 | FFA | A21 | Heavy Clothes, Magazine | Motions in safe seating area | H | Yes | Ambient |
| 123 | OOP | A21 | Heavy Clothes | Motions in NFZ | E | Yes | Ambient |
| 124 | FFC | Century Ovation | Infant Doll | Motions in safe seating area | F | No | Ambient |
| 125 | RFS | Century Ovation | Baby Doll | Motions in entire seating area | C | No | Ambient |
| 126 | ES | None | Beaded Cover, Attaché Case | Motions of track and recline | (D) | N.A. | Ambient |
| 127 | FFA | A12 | Rain Clothes | Motions in safe seating area | A | Yes | Ambient |
| 128 | OOP | Fisher Price CS | Infant Doll, Blanket | Motions in NFZ | B | No | Ambient |
| 129 | FFC | Fisher Price CS | Infant Doll | Motions in safe seating area | G | No | Ambient |
| 130 | RFS | Gerry Guard | Baby Doll, Handle up | Motions in entire seating area | H | No | Ambient |
| 131 | ES | None | Fabric Cover, Attaché Case | Motions of track and recline | (E) | N.A. | Ambient |
| 132 | FFA | A23 | Heavy Clothes, Newspaper | Motions in safe seating area | F | No | Ambient |
| 133 | OOP | A23 | Heavy Clothes | Motions in NFZ | C | No | Ambient |
| 134 | FFC | C11 | Heavy Clothes | Motions in safe seating area | D | No | Ambient |
| 135 | RFS | Smartmove 5T | Baby Doll, Blanket | Motions in entire seating area | A | No | Ambient |
| 136 | ES | None | Blanket, Attaché Case | Motions of track and recline | (B) | N.A. | Ambient |
| 137 | FFA | A32 | Rain Clothes | Motions in safe seating area | G | No | Ambient |

FIG. 24F

| | | | | | | | |
|-----|-----|-----------------|---------------------------|--------------------------------|-----|------|------------|
| 138 | OOP | C33 | Rain Clothes | Motions in NFZ | H | No | Ambient |
| 139 | FFC | C33 | Rain Clothes | Motions in safe seating area | E | No | Ambient |
| 140 | RFS | Discovery | Baby Doll, Handle up | Motions in entire seating area | F | No | Ambient |
| 141 | ES | None | Hand Bag | Motions of track and recline | (C) | N.A. | Solar Heat |
| 142 | FFA | A22 | Medium Clothes, Magazine | Motions in safe seating area | D | Yes | Solar Heat |
| 143 | OOP | A22 | Heavy Clothes | Motions in NFZ | A | Yes | Solar Heat |
| 144 | FFC | Gerry Booster | Child Doll | Motions in safe seating area | B | No | Solar Heat |
| 145 | RFS | Fisher Price CS | Baby Doll | Motions in entire seating area | G | No | Solar Heat |
| 146 | ES | None | Beaded Cover, Hand Bag | Motions of track and recline | (H) | N.A. | Solar Heat |
| 147 | FFA | A11 | Medium Clothes | Motions in safe seating area | E | Yes | Solar Heat |
| 148 | OOP | Vario Exclusive | Infant Doll | Motions in NFZ | F | No | Solar Heat |
| 149 | FFC | Ultara | Infant Doll, Blanket | Motions in safe seating area | C | No | Solar Heat |
| 150 | RFS | Baby Safe | Baby Doll | Motions in entire seating area | D | No | Solar Heat |
| 151 | ES | None | Fabric Cover, Hand Bag | Motions of track and recline | (A) | N.A. | Solar Heat |
| 152 | FFA | A33 | Medium Clothes, Newspaper | Motions in safe seating area | B | No | Solar Heat |
| 153 | OOP | A33 | Medium Clothes | Motions in NFZ | G | No | Solar Heat |
| 154 | FFC | C33 | Medium Clothes | Motions in safe seating area | H | No | Solar Heat |
| 155 | RFS | Vario Exclusive | Baby Doll, Blanket | Motions in entire seating area | E | No | Solar Heat |
| 156 | ES | None | Blanket, Hand Bag | Motions of track and recline | (F) | N.A. | Solar Heat |
| 157 | FFA | A21 | Light Clothes | Motions in safe seating area | C | No | Solar Heat |
| 158 | OOP | C21 | Light Clothes | Motions in NFZ | D | No | Solar Heat |
| 159 | FFC | C21 | Light Clothes | Motions in safe seating area | A | No | Solar Heat |
| 160 | RFS | Rock'n'Ride | Baby Doll | Motions in entire seating area | B | No | Solar Heat |

FIG. 25

Network Independent Test Set Collection Matrix (Vehicle E)

Rev 1.1 (Under Construction)

| # | Class | Subject/Object | Attributes | Actions | Config. | Belt | Conditions |
|----|-------|----------------|------------|--------------------------------|---------|------|------------|
| 1 | ES | | | Motions of track and recline | (A) | N.A. | Ambient |
| 2 | FFA | | | Motions in safe seating area | B | Yes | Ambient |
| 3 | OOP | | | Motions in NFZ | C | No | Ambient |
| 4 | FFC | | | Motions in safe seating area | D | No | Ambient |
| 5 | RFS | | | Motions in entire seating area | E | No | Ambient |
| 6 | ES | | | Motions of track and recline | (F) | N.A. | Ambient |
| 7 | FFA | | | Motions in safe seating area | G | Yes | Ambient |
| 8 | OOP | | | Motions in NFZ | H | No | Ambient |
| 9 | FFC | | | Motions in safe seating area | A | No | Ambient |
| 10 | RFS | | | Motions in entire seating area | B | No | Ambient |
| 11 | ES | | | Motions of track and recline | (C) | N.A. | Ambient |
| 12 | FFA | | | Motions in safe seating area | D | No | Ambient |
| 13 | OOP | | | Motions in NFZ | E | Yes | Ambient |
| 14 | FFC | | | Motions in safe seating area | F | No | Ambient |
| 15 | RFS | | | Motions in entire seating area | G | No | Ambient |
| 16 | ES | | | Motions of track and recline | (H) | N.A. | Ambient |
| 17 | FFA | | | Motions in safe seating area | A | No | Ambient |
| 18 | OOP | | | Motions in NFZ (standing) | B | No | Ambient |
| 19 | FFC | | | Motions in safe seating area | C | No | Ambient |
| 20 | RFS | | | Motions in entire seating area | D | No | Ambient |

FIG. 26

Characteristics of the Data Sets

| Data Set | Configurations | Setups | Vectors |
|------------------|-----------------------|---------------|----------------|
| Training | 130 | 1300 | 650,000 |
| Independent Test | 130 | 1300 | 195,000 |
| Validation | 100 | 100 | 15,000 |

FIG. 27

Distribution of Main Training Subjects

| Occupancy | Representation |
|------------------|-----------------------|
| Empty Seat | 10 % |
| Human Occupant | 32 % |
| Child Seat | 58 % |

FIG. 28

Child Seat Distribution

| Child Seat Configuration | Representation |
|---|-----------------------|
| Forward Facing Child Seat | 40 % |
| Forward Facing Child Seat Out-of-Position | 4 % |
| Rearward Facing Child Seat | 27 % |
| Rearward Facing Infant Seat | 29 % |

FIG. 29

Distribution of Environmental Conditions

| Environmental Condition | Representation |
|--------------------------------|-----------------------|
| Ambient | 56 % |
| Static Heat (Solar Lamp) | 25 % |
| Dynamic Heat (Car Heat) | 13 % |
| Dynamic Cooling (Car A C) | 6 % |

FIG. 30

Validation Data Distribution

| Occupancy | Representation |
|------------------|-----------------------|
| Empty Seat | 8 % |
| Human Occupant | 39 % |
| Child Seat | 53 % |

FIG. 31

Human Subject Distribution

| Human Occupant | Representation | Normally Seated | Out-of-Position |
|---|-----------------------|------------------------|------------------------|
| Child age 3 | 15 % | 50 % | 50 % |
| Child age 6 | 15 % | 50 % | 50 % |
| Adult 5 th percentile female | 23 % | 67 % | 33 % |
| Adult 50 th percentile Male | 23 % | 67 % | 33 % |
| Adult 95 th percentile Male | 23 % | 67 % | 33 % |

FIG. 32**Child Seat Distribution**

| Child Seat Configuration | Representation |
|-----------------------------|----------------|
| Forward Facing Child Seat | 11 % |
| Forward Facing Booster Seat | 11 % |
| Rearward Facing Child Seat | 38 % |
| Rearward Facing Infant Seat | 40 % |

FIG. 33**Distribution of Environmental Conditions**

| Environmental Condition | Representation |
|---------------------------------------|----------------|
| Ambient | 63 % |
| Static Heat (Solar Lamp) | 13 % |
| Dynamic Heat (Car Heat) | 12 % |
| Dynamic Cooling (Car Air Conditioner) | 12 % |

FIG. 34**Transducer Volume**

| Transducer | Starting Point | | | End Point | | |
|------------|----------------|-----------|---------------|-----------|-----------|---------------|
| | Sample | Time (ms) | Distance (mm) | Sample | Time (ms) | Distance (mm) |
| A | 5 | 0.83 | 142 | 29 | 4.84 | 822 |
| B | 3 | 0.50 | 85 | 35 | 5.84 | 992 |
| C | 7 | 1.17 | 198 | 34 | 5.67 | 964 |
| H | 2 | 0.33 | 57 | 32 | 5.34 | 907 |

FIG. 35**Baseline Network Performance**

| | |
|-------------------------------|--------|
| Self Test Success Rate | 95.3 % |
| Independent Test Success Rate | 94.5 % |
| Validation Test Success Rate | 92.7 % |

FIG. 36

Performance per Occupancy Subset

| Occupancy | Independent Test |
|-----------------------------------|-------------------------|
| Empty Seat | 96.1 % |
| Normally Seated Adult | 92.1 % |
| Rearward Facing Child/Infant Seat | 94.1 % |
| Forward Facing Child Seat | 96.9 % |
| Out-of-Position Human/FFCS | 93.0 % |

FIG. 37

Performance per Environmental Conditions Subset

| Environmental Condition | Independent Test |
|----------------------------------|-------------------------|
| Ambient | 95.4 % |
| Long Term Heat (Lamp Heat) | 95.2 % |
| Sort Term Heating/Cooling (HVAC) | 93.5 % |

FIG. 39

Normalization Study Results

| Normalization Method | Self Test | Independent Test | Validation Test |
|-----------------------------|------------------|-------------------------|------------------------|
| a. Whole Vector (base) | 95.3 % | 94.5 % | 92.7 % |
| b. Per Channel | 94.9 % | 93.8 % | 90.3 % |
| c. Fixed Range [0,4095] | 95.6 % | 90.3 % | 88.3 % |

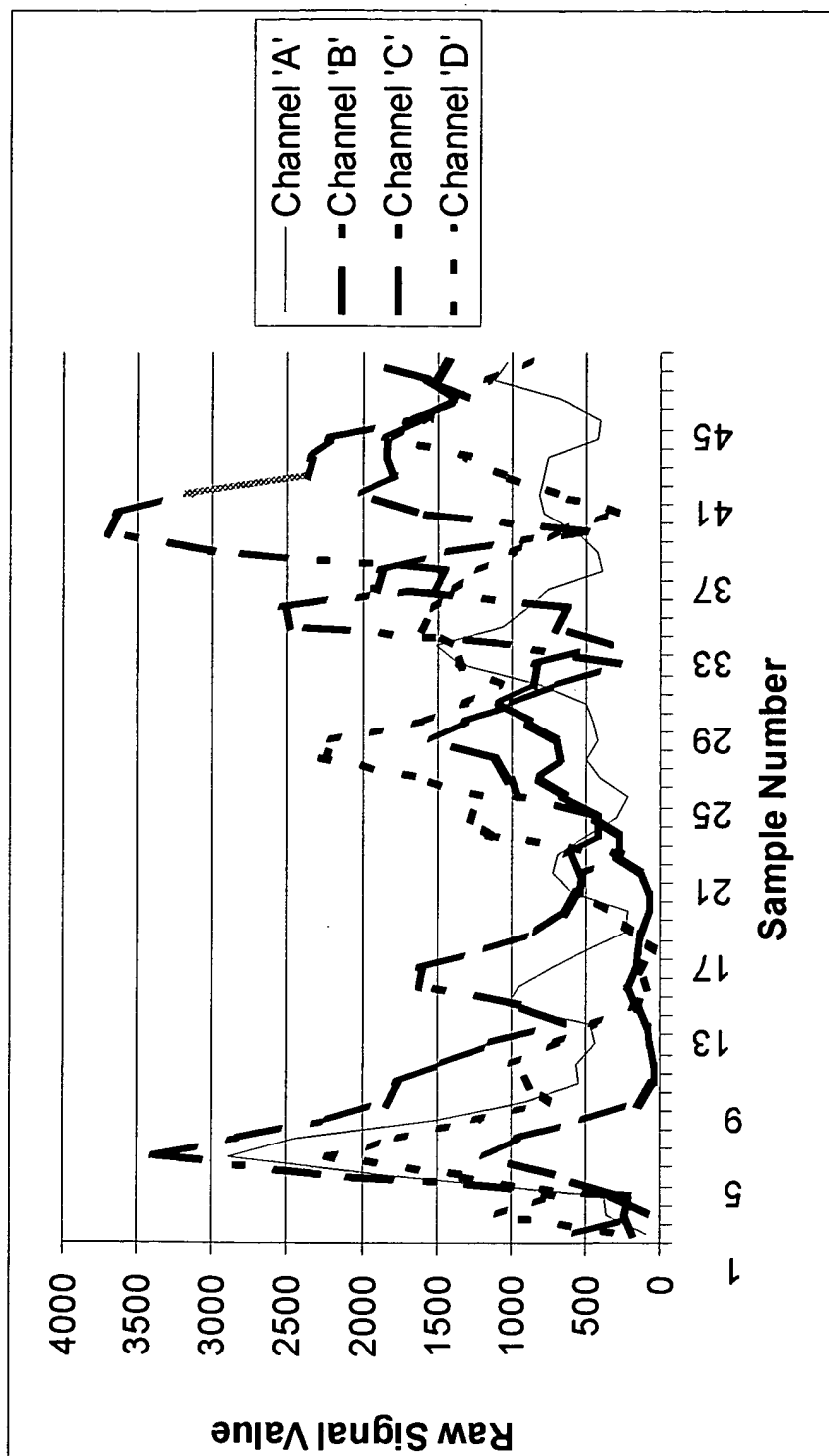


FIG. 38

FIG. 40

Low Threshold Filter Study Results

| Threshold Level | Self Test | Independent Test | Validation Test |
|------------------------|------------------|-------------------------|------------------------|
| none (base) | 95.3 % | 94.5 % | 92.7 % |
| 5% of 4095 | 95.3 % | 94.4 % | 91.9 % |
| 10% of 4095 | 95.3 % | 94.3 % | 92.5 % |
| 20% of 4095 | 95.1 % | 94.2 % | 86.4 % |